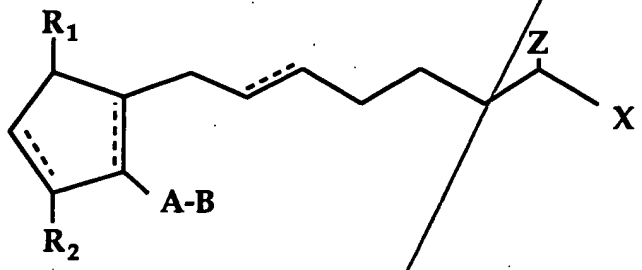
CLAIMS

1. A method of treating ocular hypertension which comprises applying to the eye an amount sufficient to treat ocular hypertension of a compound of formula I

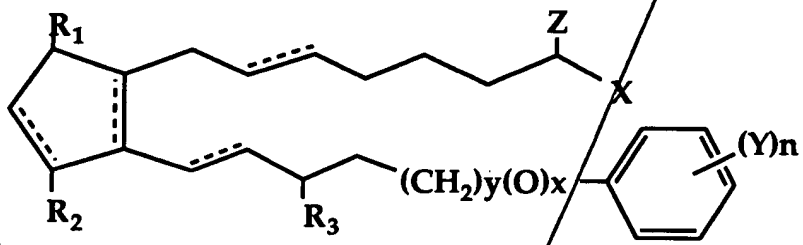


wherein the dashed bonds represent a single or double bond which can be in the cis or trans configuration; A is an alkylene or alkenylene radical having from two to six carbon atoms, which radical may be interrupted by one or more oxide radicals and substituted with one or more hydroxy, oxo, alkyloxy or akylcarboxy groups wherein said alkyl radical comprises from one to six carbon atoms; B is a cycloalkyl radical having from three to seven carbon atoms, or an aryl radical, selected from the group consisting of hydrocarbyl aryl and heteroaryl radicals having from four to ten carbon atoms wherein the heteroatom is selected from the group consisting of nitrogen, oxygen and sulfur atoms; X is a radical selected from the group consisting of-OR^4 and -$N(R^4)_2$ wherein R^4 is selected from the group consisting of hydrogen, a lower alkyl radical having from one to six

carbon atoms, R^5-C- or R^5-O-C- wherein R^5 is a lower alkyl radical having from one to six carbon atoms; Z is =O or represents 2 hydrogen radicals; one of R_1 and R_2 is =O, -OH or a -O(CO)R_6 group, and the other one is -OH or -O(CO)R_6, or R_1 is =O and R_2 is H, wherein R_6 is a saturated or unsaturated acyclic hydrocarbon group having from 1 to about 20 carbon atoms, or -(CH_2)mR_7 wherein m is 0-10, and R_7 is cycloalkyl radical, having from three to seven carbon atoms, or a hydrocarbyl aryl or heteroaryl radical, as defined above, or a pharmaceutically-acceptable salt thereof, provided however that

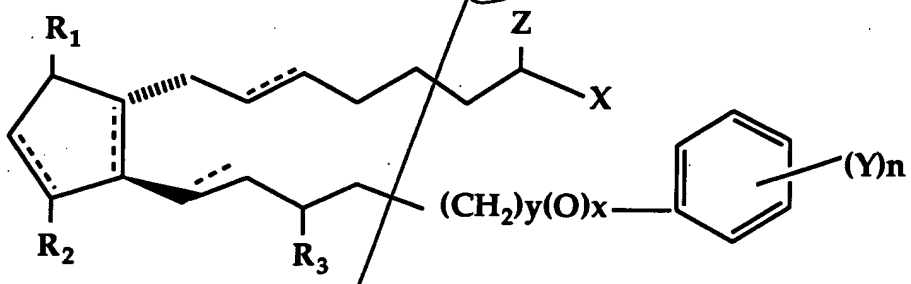
when ~~B is not substituted with a pendant heteroatom-containing radical and~~ Z is =O, then X is not $-OR^4$.

2. The method of Claim 1 wherein said compound is a represented by the formula (II)



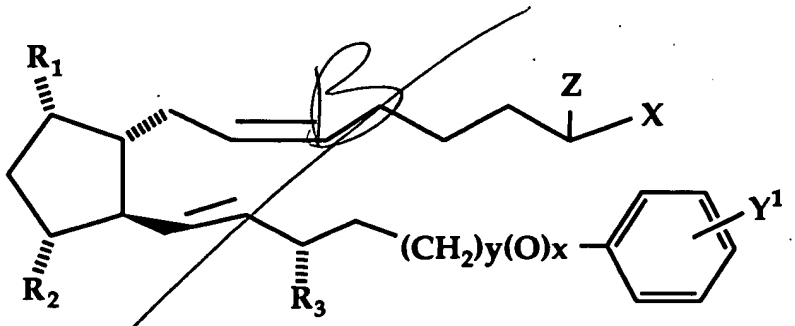
wherein y is 0 or 1, x is 0 or 1 and x+ y are not both 1, Y is a radical selected from the group consisting of alkyl, halo, nitro, amino, thiol, hydroxy, alkyloxy, alkylcarboxy and halosubstituted alkyl, wherein said alkyl radical comprises from one to six carbon atoms, n is 0 or an integer of from 1 to 3 and R_3 is =O, ~~-OH or~~ $-O(CO)R_6$.

3. The method of claim 2 wherein said compound is represented by formula III.



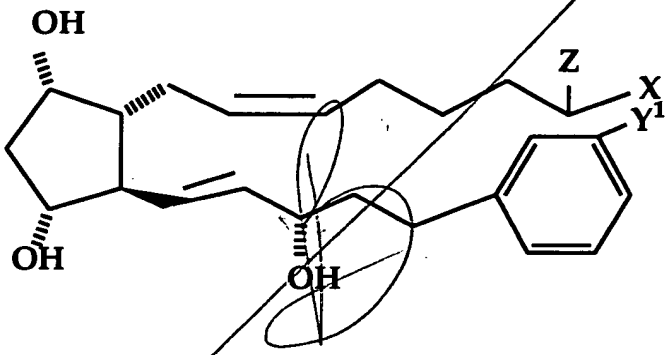
wherein hatched lines indicate the α configuration and solid triangles indicate the β configuration.

4. The method of claim 3 wherein said compound is represented by the formula IV.



wherein Y^1 is Cl or trifluoromethyl.

5. The method of claim 4 wherein said compound is a represented by the formula V



and the 9- and/or 11- and/or 15 esters, thereof.

6. The method of claim 5 wherein Z is =O and X is selected from the group consisting of NH_2 or OCH_3.

7. The method of claim 5 wherein ~~Y is O~~, Z is =O and X is selected from the group consisting of alkoxy and amido radicals.

8. The method of claim 1 wherein said compound is selected from the group consisting of:

cyclopentane heptenol-5-cis-2-(3α–hydroxy-5-phenyl-1-trans-pentenyl)-3, 5-dihydroxy, [1_α, 2_β, 3_α, 5_α];

cyclopentane heptenamide-5-cis-2-(3α–hydroxy-5-phenyl-1-trans-pentenyl)-3, 5-dihydroxy, [1_α, 2_β, 3_α, 5_α];

cyclopentane N,N-dimethylheptenamide-5-cis-2-(3α–hydroxy-5-phenyl-1-trans-pentenyl)-3, 5-dihydroxy, [1_α, 2_β, 3_α, 5_α];

cyclopentane heptenyl methoxide-5-cis-2-(3α–hydroxy-5-phenyl-1-trans-pentenyl)-3, 5-dihydroxy, [1_α, 2_β, 3_α, 5_α];

cyclopentane heptenyl ethoxide-5-cis-2-(3α–hydroxy-4-meta-chloro-phenoxy-1-trans-butenyl)-3, 5-dihydroxy, [1_α, 2_β, 3_α, 5_α];

cyclopentane heptenylamide-5-cis-2-(3α–hydroxy-4-meta-chloro-phenoxy-1-trans-butenyl)-3, 5-dihydroxy, [1_α, 2_β, 3_α, 5_α];

cyclopentane heptenylamide-5-cis-2-(3α–hydroxy-4-meta-trifluoromethyl-phenoxy-1-trans-butenyl)-3, 5-dihydroxy, [1_α, 2_β, 3_α, 5_α];

cyclopentane N-isopropyl hepteneamide-5-cis-2-(3α–hydroxy-5-phenyl-1-trans-pentenyl)-3, 5-dihydroxy, [1_a, 2_b, 3_a, 5_a];

cyclopentane N-ethyl heptenamide-5-cis-2-(3α–hydroxy-5-phenyl-1-trans-pentenyl)-3, 5-dihydroxy, [1_α, 2_β, 3_α, 5_α];

cyclopentane N-methyl heptenamide-5-cis-2-(3α–hydroxy-5-phenyl-1-trans-pentenyl)-3, 5-dihydroxy, [1_α, 2_β, 3_α, 5_α];

cyclopentane heptenol-5-cis-2-(3-αhydroxy-4-m-chlorophenoxy-1-trans-butenyl)-3, 5-dihydroxy, [1_α, 2_β, 3_α, 5_α];

cyclopentane heptenamide-5-cis-2-(3α–hydroxy-4-m-chlorophenoxy-1-trans-butenyl)-3, 5-dihydroxy, [1_α, 2_β, 3_α, 5_α] and

cyclopentane heptenol-5-cis-2-(3α–hydroxy-5-phenylpentyl)3, 5-dihydroxy, [1_α, 2_β, 3_α, 5_α]

Sub B2

9. The method of claim 7 wherein X is selected from the group consisting of NH_2 and OCH_3.

10. The method of claim 1 wherein said compound is selected from the group consisting of:

cyclopentane heptenoic acid-5-cis-2-(3α–hydroxy-4-meta-chloro-phenoxy-1-trans-butenyl)-3, 5-dihydroxy, [1_α, 2_β, 3_α, 5_α];

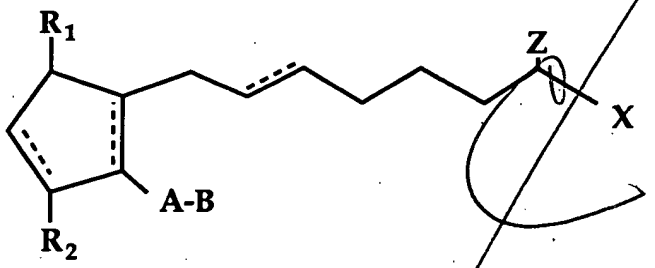
cyclopentane heptenylamide-5-cis-2-(3α–hydroxy-4-meta-chloro-phenoxy-1-trans-butenyl)-3, 5-dihydroxy, [1_α, 2_β, 3_α, 5_α];

cyclopentane heptenylamide-5-cis-2-(3α–hydroxy-4-meta-trifluoromethylphenoxy-1-trans-butenyl)-3, 5-dihydroxy, [1_α, 2_β, 3_α, 5_α]; and

cyclopentane heptenoic acid-5-cis-2-(3α–hydroxy-4-meta-trifluoromethyl-phenoxy-1-trans-butenyl)-3, 5-dihydroxy, [1_α, 2_β, 3_α, 5_α].

Sub C

11. A method of treating cardiovascular pulmonary-respiratory, gastrointestinal, reproductive and allergic diseases and shock in a human which comprises administering to said human an effective amount of a compound of formula I

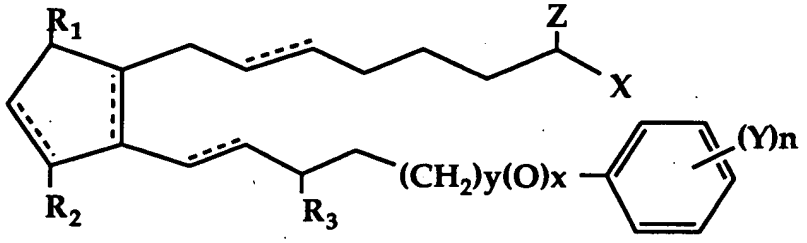


wherein the dashed bonds represent a single or double bond which can be in the cis or trans configuration, A is an alkylene or alkenylene radical having from two to six carbon atoms, which radical may be interrupted by one or more oxide radicals and substituted with one or more hydroxy, oxo, alkyloxy or akylcarboxy groups wherein said alkyl radical comprises from one to six carbon

atoms, or an aryl radical, selected from the group consisting of hydrocarbyl aryl and heteroaryl radicals having from four to ten carbon atoms wherein the heteroatom is selected from the group consisting of nitrogen, oxygen and sulfur atoms; X is a radical selected from the group consisting of-OR^4 and -$N(R^4)_2$ wherein R^4 is selected from the group consisting of hydrogen, a lower alkyl radical having from one to six

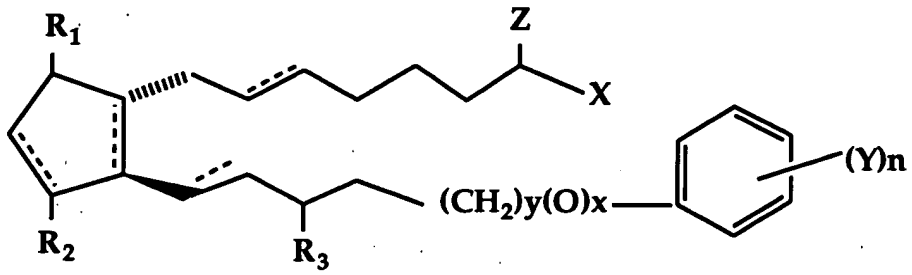
carbon atoms, R^5-$\overset{O}{\overset{\|}{C}}$- or R^5-O-$\overset{O}{\overset{\|}{C}}$- wherein R^5 is a lower alkyl radical having from one to six carbon atoms; Z is =O or represents 2 hydrogen radicals; one of R_1 and R_2 is =O, -OH or a -$O(CO)R_6$ group, and the other one is -OH or -$O(CO)R_6$, or R_1 is =O and R_2 is H, wherein R_6 is a saturated or unsaturated acyclic hydrocarbon group having from 1 to about 20 carbon atoms, or -$(CH_2)mR_7$ wherein m is 0-10, and R_7 is cycloalkyl radical, having from three to seven carbon atoms, or a hydrocarbyl aryl or heteroaryl radical, as defined above, or a pharmaceutically-acceptable salt thereof, provided however that when B is not substituted with a pendant heteroatom-containing radical and Z is =O, then X is not -OR^4.

12. The method of Claim 11 wherein said compound is a represented by the formula (II)



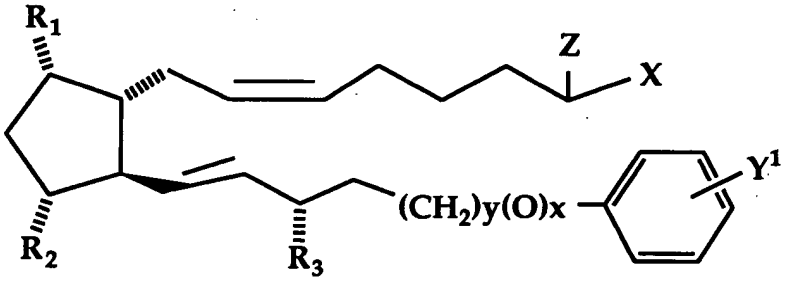
wherein y is 0 or 1, x is 0 or 1 and x+ y are not both 1, Y is a radical selected from the group consisting of alkyl, halo, nitro, amino, thiol, hydroxy, alkyloxy, alkylcarboxy and halosubstituted alkyl, wherein said alkyl radical comprises from one to six carbon atoms, n is 0 or an integer of from 1 to 3 and R_3 is =O, -OH or -$O(CO)R_6$.

13. The method of claim 12 wherein said compound is represented by formula III.



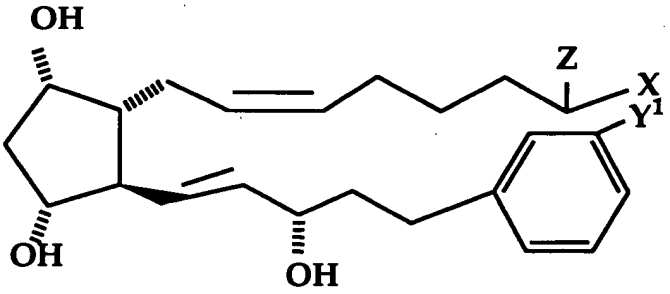
wherein hatched lines indicate the α configuration and solid triangles indicate the β configuration.

14. The method of claim 13 wherein said compound is represented by the formula IV.



wherein Y^1 is Cl or trifluoromethyl.

15. The method of claim 14 wherein said compound is a represented by the formula V



and the 9- and/or 11- and/or 15 esters, thereof.

16. The method of claim 15 wherein Z is =O and X is selected from the group consisting of NH_2 or OCH_3.

17. The method of claim 5 wherein Y is O, Z is =O and X is selected from the group consisting of alkoxy and amido radicals.

18. The method of claim 1 wherein said compound is selected from the group consisting of:

cyclopentane heptenol-5-cis-2-(3α–hydroxy-5-phenyl-1-trans-pentenyl)-3, 5-dihydroxy, [1_α, 2_β, 3_α, 5_α];

cyclopentane heptenamide-5-cis-2-(3α–hydroxy-5-phenyl-1-trans-pentenyl)-3, 5-dihydroxy, [1_α, 2_β, 3_α, 5_α];

cyclopentane N,N-dimethylheptenamide-5-cis-2-(3α–hydroxy-5-phenyl-1-trans-pentenyl)-3, 5-dihydroxy, [1_α, 2_β, 3_α, 5_α];

cyclopentane heptenyl methoxide-5-cis-2-(3α–hydroxy-5-phenyl-1-trans-pentenyl)-3, 5-dihydroxy, [1_α, 2_β, 3_α, 5_α];

cyclopentane heptenyl ethoxide-5-cis-2-(3α–hydroxy-4-meta-chloro-phenoxy-1-trans-butenyl)-3, 5-dihydroxy, [1_α, 2_β, 3_α, 5_α];

cyclopentane heptenylamide-5-cis-2-(3α–hydroxy-4-meta-chloro-phenoxy-1-trans-butenyl)-3, 5-dihydroxy, [1_α, 2_β, 3_α, 5_α];

cyclopentane heptenylamide-5-cis-2-(3α–hydroxy-4-meta-trifluoromethyl-phenoxy-1-trans-butenyl)-3, 5-dihydroxy, [1_α, 2_β, 3_α, 5_α];

cyclopentane N-isopropyl heptenamide-5-cis-2-(3α–hydroxy-5-phenyl-1-trans-pentenyl)-3, 5-dihydroxy, [1_a, 2_b, 3_a, 5_a];

cyclopentane N-ethyl heptenamide-5-cis-2-(3α–hydroxy-5-phenyl-1-trans-pentenyl)-3, 5-dihydroxy, [1_α, 2_β, 3_α, 5_α];

cyclopentane N-methyl heptenamide-5-cis-2-(3α–hydroxy-5-phenyl-1-trans-pentenyl)-3, 5-dihydroxy, [1_α, 2_β, 3_α, 5_α];

cyclopentane N-methyl heptenamide-5-cis-2-(3α–hydroxy-5-phenyl-1-trans-pentenyl)-3, 5-dihydroxy, [1_α, 2_β, 3_α, 5_α];

cyclopentane heptenol-5-cis-2-(3α–hydroxy-4-m-chlorophenoxy-1-trans-butenyl)-3, 5-dihydroxy, [1_α, 2_β, 3_α, 5_α];

cyclopentane heptenamide-5-cis-2-(3α–hydroxy-4-m-chlorophenoxy-1-trans-butenyl)-3, 5-dihydroxy, [1_α, 2_β, 3_α, 5_α] and

cyclopentane heptenol-5-cis-2-(3α–hydroxy-5-phenylpentyl)3, 5-dihydroxy, [1_α, 2_β, 3_α, 5_α]

19. The method of claim 17 wherein X is selected from the group consisting of NH_2 and OCH_3.

20. The method of claim 11 wherein said compound is selected from the group consisting of:

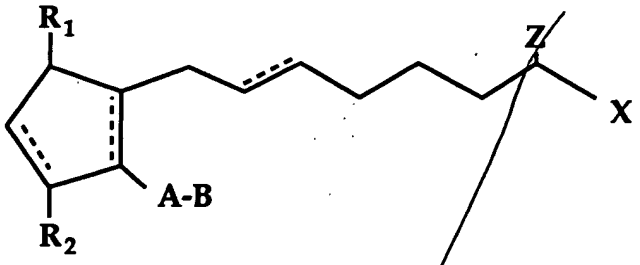
cyclopentane heptenoic acid-5-cis-2-(3α–hydroxy-4-meta-chloro-phenoxy-1-trans-butenyl)-3, 5-dihydroxy, [1_α, 2_β, 3_α, 5_α];

cyclopentane heptenylamide-5-cis-2-(3α–hydroxy-4-meta-chloro-phenoxy-1-trans-butenyl)-3, 5-dihydroxy, [1_α, 2_β, 3_α, 5_α];

cyclopentane heptenylamide-5-cis-2-(3α–hydroxy-4-meta-trifluoromethyl-phenoxy-1-trans-butenyl)-3, 5-dihydroxy, [1_α, 2_β, 3_α, 5_α]; and

cyclopentane heptenonic acid-5-cis-2-(3α–hydroxy-4-meta-trifluoromethylphenoxy-1-trans-butenyl)-3, 5-dihydroxy, [1_α, 2_β, 3_α, 5_α].

21. A compound useful for treating cardiovascular pulmonary-respiratory, gastrointestinal, reproductive and allergic diseases and



wherein the dashed bonds represent a single or double bond which can be in the cis or trans configuration, A is an alkylene or alkenylene radical having from two to six carbon atoms, which radical may be interrupted by one or more oxide radicals and substituted with one or more hydroxy, oxo, alkyloxy or akylcarboxy groups wherein said alkyl radical comprises from one to six carbon atoms; B is a cycloalkyl radical having from three to seven carbon atoms, or an aryl radical, selected from the group consisting of hydrocarbyl aryl and heteroaryl radicals having from four to ten carbon atoms wherein the heteroatom is selected from the group consisting of nitrogen, oxygen and sulfur atoms; X is a radical selected from the group consisting of $-OR^4$ and $-N(R^4)_2$ wherein R^4 is selected from the group consisting of hydrogen, a lower alkyl radical having from one to six

carbon atoms, R^5-C(=O)- or R^5-O-C(=O)- wherein R^5 is a lower alkyl radical having from one to six carbon atoms; Z is =O or represents 2 hydrogen radicals; one of R_1 and R_2 is =O, -OH or a $-O(CO)R_6$ group, and the other one is -OH or $-O(CO)R_6$, or R_1 is =O and R_2 is H, wherein R_6 is a saturated or unsaturated acyclic hydrocarbon group having from 1 to about 20 carbon atoms, or $-(CH_2)mR_7$ wherein m is 0-10, and R_7 is cycloalkyl radical, having from three to seven carbon atoms, or a hydrocarbyl aryl or heteroaryl radical, as defined above, or a pharmaceutically-acceptable salt thereof, provided however that when B is not substituted with a pendant heteroatom-containing radical and Z is =O, then X is not $-OR^4$.

Z is =O, then X is not -OR4

22. The compound of claim 21 wherein said compound is selected from the group consisting of

~~cyclopentane heptenoic acid-5-cis-2-(3α-hydroxy-4-meta-chloro-phenoxy-1-trans-butenyl)-3, 5-dihydroxy, [1α, 2β, 3α, 5α];~~

cyclopentane heptenylamide-5-cis-2-(3α–hydroxy-4-meta-chloro-phenoxy-1-trans-butenyl)-3, 5-dihydroxy, [1_α, 2_β, 3_α, 5_α]; and

cyclopentane heptenylamide-5-cis-2-(3α–hydroxy-4-meta-trifluoromethylphenoxy-1-trans-butenyl)-3, 5-dihydroxy, [1_α, 2_β, 3_α, 5_α].

23. A pharmaceutical composition comprising a therapeutically effective amount of a compound according to claim 21 in admixture with a non-toxic, pharmaceutically acceptable liquid vehicle.

24. A pharmaceutical composition comprising a therapeutically effective amount of a compound according to claim 22 in admixture with a non-toxic, pharmaceutically acceptable liquid vehicle.

25. A method of treating ocular hypertension or glaucoma which comprises applying to the eye an amount sufficient to treat ocular hypertension of a compound selected from the group consisting of cloprostenol, fluprostenol and their pharmaceutically acceptable esters and salts.